

Student Name:

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University of Bahrain

College of Information Technology
Department of Computer Science

ITCS332: Concepts of Programming Languages

QUIZ#7: Chapter 6_Types

- 1) Write an example of C++ code that illustrates (creates) lost heap dynamic variable.

```
void      *p1;

p1 = new int(10);

p1 = new float(7.4); // heap location that contains 10 is lost.
```

- 2) Write an example of C++ code that illustrates (creates) a dangling pointer.

```
double    *p1,*p2;

p1 = new double(55.75);

p2 = p1;

delete p1; // p2 is a dangling pointer
```

- 3) Give two differences between the arrays and the records.

- a) Arrays consist of **homogeneous** elements while records consist of **heterogeneous** elements.
- b) Array elements are accessed using **indices**, while record elements are accessed using **names**.

- 4) Given a matrix **U: array [10 .. 100][20 .. 80] of FLOAT**; starting address of array is 2480; element size is 4 bytes. Assuming column major ordering, calculate the address of matrix element **U[60][40]**.

2480 + [(40-20)*(100-10+1) + (60-10)]* 4

By whom each of the following is decided?

- 5) In C++, an integer value occupies 4 bytes is decided by **Language Implementer**.
- 6) In FORTRAN95, the % symbol is used to reference record members is decided by **Language Designer**
- 7) Generating a code for mapping every array reference to a memory address is performed by **Language Compiler**.

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- 8) Write an example of C++ code that illustrates (creates) lost heap dynamic variable.

```
void      *p1;

p1 = new int(10);

p1 = new float(7.4); // heap location that contains 10 is lost.
```

- 9) Write an example of C++ code that illustrates (creates) a dangling pointer.

```
double    *p1,*p2;

p1 = new double(55.75);

p2 = p1;

delete p1; // p2 is a dangling pointer
```

- 10) Give two differences between the associative and regular arrays.

- a) Regular arrays consist of **ordered** elements while associative arrays consist of **unordered** elements.
- b) Regular arrays are of **fixed size**, while associative arrays are of **variable size**.

- 11) Given a matrix **U: array[100 .. 200][200 .. 220] of double**; starting address of array is 7200; element size is 8 bytes. Show ALL your calculations. Assuming row major ordering, calculate the address of matrix element U[140][208].

7200 + [(140-100)*(220-200+1) + (208-200)]* 8

By whom each of the following is decided?

- 12) A C++ variable of type double occupies 8 bytes. **Language Implementer**
- 13) In C++, array index is enclosed in square brackets []. **Language Designer.**
- 14) Using tombstones or locks and keys in solving dangling pointer problem.

Language Implementer

- 1) The allocation and de-allocation of space to arrays in JAVA. _____.
 - 2) Decimal date type is included in COBOL. _____.
 - 3) Strings length is static or dynamic. _____.
 - 4) Strings are of primitive or structured type. _____.
 - 5)
- 15) **By whom each of the following is decided?**
- a) C++ pointers are defined using * symbol. **Language Designer.**
 - b) PASCAL subscripts can be on any ordinal type. **Language Designer**
 - c) A Prolog statement is terminated by a dot. **Language Designer.**
- 16) **Who is responsible for each of the following:**
- a) Pointers are included in C# and excluded from JAVA. **Language Designer.**
 - b) The syntax used to reference members in records. **Language Designer.****
 - c) Strings are implemented using adjacent memory cells or linked list.
Language Implementer.
 - d) Generating range-checking code for every assignment to a subrange variable.
Language Implementer.
- 17) **By whom each of the following is decided?**
- a) Using adjacent memory cells / linked list in implementing strings.
Language Implementer
 - b) Generating range-checking code for every assignment to a subrange variable is performed by.
Language Compiler.
 - c) In C++, row-major ordering of multi-dimensional arrays is selected by
Language Implementer.
 - d) Using tombstones or locks and keys in solving dangling pointer problem.
Language Implementer
 - e) Generating range-checking code for every assignment to a subrange variable.
Language Translator
 - f) C++ array index is enclosed in square brackets []. **Language Designer**
 - g) FORTRAN95 uses % symbol to reference record members. **Language Designer**
- 1) Regular array elements are accessed using **indices**, while associative array elements are accessed using **keys**.
 - 2) The two forms of references to record fields are **fully-qualified** and **elliptical**.

- 3) The two mechanisms used to detect and solve dangling pointers are: **Tombstones** and **Locks and Keys**.